

AMENDMENTS TO THE DRAWINGS

FIG. 2 is amended to add reference numbers 25 and 44.

FIG. 3 is amended to add labels to the boxes of FIG. 3.

Because this amendment is being faxed to the patent office, a copy of the amended drawings will accompany this fax. The original corrected drawings will be sent through the mail under a separate cover.

The amended drawings have "Replacement Sheet" added to the legend of each sheet.

REMARKS

Claims 1, 3-6, 8, and 10-23 are in the present application.

Claims 1, 4, 8, and 11 are amended to more particularly point out and distinctly claim the present subject matter.

Claims 3, 5-6, 10, and 12-15 are amended to provide proper antecedent basis with the respective independent claims.

Claims 2, 7, and 9 are cancelled.

New claims 20-23 are added.

Support for the amendments to the claims and for new claims 20-23 can be found at least on page 4, line 28 through page 5, line 24, on page 6, line 20 through page 7 line 9, and in FIG. 2.

Regarding the Drawings:

The Office Action indicates that reference numbers 25 and 44 were missing from FIG. 2 and also requested adding labels to the boxes of FIG. 3.

FIG. 2 is amended to add reference numbers 25 and 44.

FIG. 3 is amended to add labels to the boxes of FIG. 3.

"Replacement Sheet" is added to the legend of each drawing sheet.

Because this amendment is being faxed to the patent office, a copy of the amended drawings will accompany this fax. The original corrected drawings will be sent through the mail under a separate cover.

Regarding the Abstract:

The Office Action indicates that the current abstract is not much more informative than the title of the invention and that the abstract can be up to 150 words in length.

Although the length of an abstract may be up to 150 words in length, applicants prefer to use the abstract as filed with the application and prefer not to expand the abstract.

Election/Restriction:

The Office Action states that a restriction is required under 35 U.S.C. 121 to claims 1-15 (Group I), or claims 16-19 (Group II).

The requirement for restriction that has been made in the present application is traversed. It is first noted that restriction is never mandatory and is discretionary under 35 U.S.C. 121 only when "two or more independent and distinct" inventions are claimed. The Office Action alleges that restriction is required because the invention of applicant's claims is "distinct". It has not been alleged that applicant's claimed inventions are "independent and distinct", and yet this requirement is a prerequisite under the Patent Statutes before the Commissioner's discretion may be exercised under 35 U.S.C. 121.

Thus, it is respectfully submitted that the restriction requirement should be removed because there is not a valid ground under 35 U.S.C. 121 for exercising the Commissioner's discretion and requiring the restriction.

The provisional election of the group I claims, i.e. claims 1-15, is hereby confirmed. The restriction requirement is traversed, however, and reconsideration and

withdrawal of the requirement for restriction is respectfully requested.

35 USC 112 Rejection:

Claims 2, 4, 10, and 11 were rejected under 35 USC 112 as failing to comply with the enablement requirement.

The Office Action indicates that claims 2 and 10 are rejected because the output capacitor receives the pump voltage plus the high side voltage. Applicants respectfully submit that the output capacitor is charged to a voltage approximately equal to the pump voltage and that the output capacitor is not charged to the high side voltage. This is explained in the specification on page 6, line 20 through page 7, line 9. Thus, it is respectfully submitted that claims 2 and 10 are enabled by at least this portion of the specification. Additionally, it should be noted that claim 2 is cancelled and that claim 10 is amended, however, the cancellation of claim 2 and the amendment of claim 10 was not for the purpose of traversing the 35 USC 112 rejection.

The Office Action also indicates that claims 4 and 11 are not enabled because the pump capacitor is charged to the high side voltage. Applicants respectfully submit that the wording of claims 4 and 11 as filed may have inadvertently had a typographical error. It is believed that the amendments to claims 4 and 11 correct the typographical error. Support for the amendments to claims 4 and 11 are found at least on page 6, line 20 through page 7, line 9, of the specification.

First 35 USC 102 Rejection:

Claims 1-11, 14, and 15 were rejected under 35 USC 102 as being anticipated by United States patent number 6,483,377 issued to White et al ("White"). This rejection is respectfully traversed.

Applicants' amended claim 1 includes, among other features, configuring the charge pump controller to receive an operating voltage for operating the charge pump controller from a second voltage supply that is external to the charge pump controller and that has a second value and wherein the second value of the second voltage supply is independent of the first voltage supply. At least these elements of claim 1 are not disclosed by White.

Note that White uses a single voltage supply (V_m) and that White's circuit of FIG. 1 charges capacitor C1 to the same voltage V_m . It should be further noted that the White states in column 2, lines 30-31, that FIG. 1 illustrates an IC that has capacitor 113 (C1) external to the IC. Also, note in FIG. 1 that capacitor 113 (C1) is charged to the voltage of V_m during one cycle and during a second cycle the voltage from capacitor 113 plus the voltage of V_m are applied to terminal Vpump so that Vpump is the output of the charge pump circuit. Thus, the charge pump controller does not receive a second voltage supply that is external to the controller IC and does not charge the output capacitor from the second voltage supply.

Accordingly, it is respectfully submitted that amended claim 1 is not disclosed by the relied on reference of White.

Claims 3-, 20, 21, and 22 depend from claim 1 and are believed to be allowable for least the same reasons as claim 1.

Additionally, claim 4 includes, among other things, coupling a pump capacitor to charge to a voltage substantially equal to the first value of the first voltage supply and to couple the pump voltage across the pump capacitor to the output capacitor. White does not disclose at least this element of claim 4. White discloses in column 2, lines 24-29, that capacitor 113 (C1) is used to double the voltage of the supply V_m . White further discloses in column 2, lines 40-57, that capacitor 113 is charged to the value of V_m . Thus, capacitor 113 is charged to the same voltage to which capacitor 111 is connected. It is respectfully submitted that White does not disclose that coupling the pump voltage across one capacitor to another one. Accordingly, it is respectfully submitted that White does not disclose claim 4.

Also, new claim 20 includes, among other features, configuring the charge pump controller to form a regulated voltage from the second voltage supply and form the pump voltage to be substantially equal to the regulated voltage. White does not disclose using a second voltage supply much less forming a regulated voltage from the second voltage supply and additionally does not disclose forming the pump voltage to be substantially equal to such a regulated voltage. Accordingly, it is respectfully submitted that new claim 20 is not disclosed by White.

Also, new claim 21 includes configuring the charge pump controller to form a drive signal that controls switching the output capacitor into a charging configuration during a first portion of the drive signal and that controls

switching the output capacitor into a non-charging configuration during a second portion of the drive signal and that also couples the pump voltage from the drive signal to the output capacitor. White does not disclose a drive signal that both couples the pump voltage from the drive signal to the output capacitor and that also controls the switching configuration of the capacitor. White discloses using control signal to switch the switching transistors while the pump voltage is provided by V_m through the switches. White does not couple the pump voltage from the drive signal to the capacitor. Accordingly, it is respectfully submitted that new claim 20 can not be disclosed by White.

Amended claim 8 includes, among other features, a first input coupled to receive a first supply voltage; an output capacitor reference to the voltage supply side of the first supply voltage; a second supply voltage; and a charge pump controller coupled to receive the second supply voltage wherein the second supply voltage is external to the charge pump controller, the charge pump controller configured to use the second supply voltage to generate an operating supply of the charge pump controller and configured to form a pump voltage that is derived from the operating supply. At least these elements of claim 8 are not disclosed by White. At the minimum, White does not disclose forming the pump voltage that is derived from the second supply voltage. Note that White has one supply voltage V_m and that capacitor 113 (C1) is also charged to the same voltage V_m (see column 2, lines 3-4, and lines 39-57). Thus, White discloses that capacitor 113 is charged to V_m and that capacitor 113 and voltage source V_m are connected in series to formed the

output voltage V_{pump} . White does not receive a second supply voltage that is used to form the operating supply of the charge pump controller and does not form the pump voltage from this operating supply. Accordingly, it is respectfully submitted that White can not disclose claim 8.

Claims 10-11, 14, 15, and 23 depend from claim 8 and believed to be allowable for least the same reasons as claim 8.

Additionally, claim 11 includes the charge pump capacitor coupled to receive the pump voltage from the charge pump controller and to couple the pump voltage from the charge pump controller across the pump capacitor to the output capacitor. White does not disclose coupling the charge pump voltage from the charge pump controller and across the pump capacitor to the output capacitor. White couples the voltage to capacitor 113 then couples capacitor 113 to the output V_{pump} . White's voltage is not coupled from the controller across the capacitor to the output capacitor. Accordingly, it is respectfully submitted that claim 11 is not disclosed by White.

Further, new claim 23 includes the charge pump controller is configured to use the operating supply to form an oscillating signal that controls alternately coupling the output capacitor in a charging configuration and a non-charging configuration. White does not use the second supply voltage to form an operating voltage then use the operating voltage to form the oscillating signal that control switching of the capacitor 113. White disclose the use of one supply voltage V_m . Accordingly, it is respectfully submitted that White can not disclose claim 11.

Second 35 USC 102 Rejection:

Claims 1-11, 14, and 15 were rejected under 35 USC 102 is being anticipated by United States patent number 6,717,829 issued to Appeltans ("Appeltans"). This rejection is respectfully traversed.

Applicants' amended claim 1 includes, among other features, configuring the charge pump controller to receive an operating voltage for operating the charge pump controller from a second voltage supply that is external to the charge pump controller and that has a second value wherein the charge pump controller is configured to derive a pump voltage to charge the output capacitor from the second voltage supply and wherein the second value of the second voltage supply is independent of the first voltage supply. At least these elements of claim 1 are not disclosed by Appeltans.

Appeltans discloses in column 2, lines 14-15, and in column 3, line 48 through column 4, line 9, that the circuit of FIG. 2 receives a single voltage source Vin and that one terminal of capacitor 2 is connected to Vin. Appeltans does not disclose referencing the output capacitor to one voltage supply and using a second voltage supply from external to the charge pump controller to operate the charge pump controller and to form the pump voltage, and also does not disclose that the two voltage sources are independent of each other. Applicants respectfully submit that Appeltans uses a single voltage Vin to form the pump voltage and to which the output capacitor is referenced. Accordingly, it is respectfully submitted that Appeltans cannot anticipate amended claim 1.

Claims 3-6 and 20-22 depend from claim 1 and are believed to be allowable for least the same reasons as claim 1.

Additionally, claim 4 includes, among other things, coupling a pump capacitor to charge to a voltage substantially equal to the first value and to couple the pump voltage across the pump capacitor to the output capacitor. At least this element of claim 4 is not disclosed by Appeltans. Appeltans does not charge capacitor 1 to the voltage of Vin but charges it to a different voltage. Appeltans also does not couple the pump voltage across capacitor 1 to capacitor 2 as required by claim 4. Accordingly, it is respectfully submitted that claim 4 can not be anticipated by Appeltans.

Also, claim 6 includes coupling the charge pump controller to generate a regulated voltage from the second voltage supply and to couple the regulated voltage to an output of the charge pump controller. Appeltans does not generate a regulated voltage from a second voltage supply. Appeltans does not disclose the source of Vref however, applicants respectfully submit that Vref is generated by the only power supply disclosed which is Vin. Accordingly, it is respectfully submitted that Appeltans does not anticipate claim 6.

New claim 20 includes configuring the charge pump controller to form a regulated voltage from the second voltage supply and to form the pump voltage to be substantially equal to the regulated voltage. Appeltans does not disclose using a second voltage supply from external to the charge pump controller much less using such a second voltage supply to form a regulated voltage nor does

Appeltans disclose forming the pump voltage to be substantially equal to such regulated voltage.

New claim 21 includes, among other features, includes configuring the charge pump controller to form a drive signal that controls switching the output capacitor into a charging configuration during a first portion of the drive signal and that controls switching the output capacitor into a non-charging configuration during a second portion of the drive signal and that also couples the pump voltage from the drive signal to the output capacitor. Appeltans does not disclose a drive signal that couples the pump voltage from the drive to the output capacitor much less such a drive signal that also controls switching the capacitor configuration switches.

New claim 22 includes configuring the charge pump controller to form a drive signal that controls switching of a pump capacitor during a first and a second portion of the drive signal and wherein the drive signal has a value that is substantially equal to the pump voltage. Appeltans discloses using drive signals labeled as phase 1 and phase 2 to control the switching of capacitor 1, however, the drive signal used to control the switching does not have a value that is substantially equal to the pump voltage.

Accordingly, it is respectfully submitted that Appeltans cannot anticipate new claim 20-22.

Amended claim 8 includes, among other features, a second supply voltage that is different from the first supply voltage, a charge pump controller coupled to receive the second supply voltage wherein the second supply voltage is external to the charge pump controller, the charge pump controller configured to use the second supply voltage for

the operating supply of the charge pump controller and configured to form a pump voltage that is derived from the operating supply. It is respectfully submitted that at least these elements of amended claim 8 are not disclosed by Appeltans. Capacitor 2 of Appeltans is connected to Vin, however, Appeltans does not disclose a second supply voltage that is different from the first supply voltage and does not disclose coupling the charge pump controller to use the second supply voltage for the operating supply of the charge pump controller nor does Appeltans disclose using such a second power supply to form the pump voltage. Accordingly, it is respectfully submitted that amended claim 8 cannot be anticipated by Appeltans.

Claims 10-11, 14, 15, and new claim 23 depend from claim 8 and are believed to be allowable for least the same reasons as claim 8.

Additionally, claim 11 includes a charge pump capacitor coupled to receive the pump voltage and to couple the pump voltage from the charge pump controller across the pump capacitor to the output capacitor. Appeltans does not disclose that capacitor 1 couples voltage Vref across capacitor 1 to capacitor 2. In fact, Appeltans teaches that capacitor 1 is coupled in parallel with capacitor 2 in order to transfer the voltage from capacitor 1 to capacitor 2. Appeltans does not disclose that the pump voltage is coupled across capacitor 1 to capacitor 2. Accordingly, it is respectfully submitted that Appeltans does not disclose claim 11.

Further, claim 23 includes the charge pump controller configured to use the second supply voltage to provide operating power to form an oscillating signal that controls

alternately coupling the output capacitor in a charging configuration and a non-charging configuration. Appeltans does not disclose using a second supply voltage to provide operating power in order to form an oscillating signal that controls the coupling of the output capacitor. Appeltans discloses a single supply voltage V_{in} that is connected to capacitor 2. It is respectfully submitted that Appeltans does not disclose a second supply voltage that is used to form an oscillating signal to control coupling of the output capacitor. Accordingly, it is respectfully submitted that claim 22 is not disclosed by Appeltans.

First 35 USC 103 rejection:

Claims 12 and 13 were rejected under 35 U.S.C. 103 over White in view of United States patent number 6,707,335 issued to Kawai et al ("Kawai"). This rejection is respectfully traversed. Claims 12 and 13 depend from claim 8 and are believed to be allowable for least the same reasons as claim 8 as explained in the traversal of the 35 USC 102 rejection of claim 8 over White. Combining Kawai with White does not make up for the deficiencies of White. Accordingly, it is respectfully submitted that claims 12 and 13 are not made obvious by the combined relied on references.

Second 35 USC 103 rejection:

Claims 12 and 13 were rejected under 35 U.S.C. 103 over Appeltans in view of Kawai. This rejection is respectfully traversed. Claims 12 and 13 depend from claim 8 and are believed to be allowable for least the same reasons as claim 8 as explained in the traversal for the 35 USC 102 rejection of claim 8 over Appeltans. Combining Kawai with Appeltans

and does not make up for these deficiencies of Appeltans. Accordingly, it is respectfully submitted that the combined relied on references to not make obvious claims 12 and 13.

CONCLUSION

Applicant(s) made an earnest attempt to place this case in condition for allowance. In view of all of the above, it is believed that the claims are allowable, and that the case is now in condition for allowance, which action is earnestly solicited.

By this amendment, three dependent claims are cancelled and four dependent claims are added resulting in three independent claims and seventeen dependent claims for a total of twenty claims. Although it is believed that no fees are due for this amendment, the Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 50-1086.

If there are matters which can be discussed by telephone to further the prosecution of this Application, the Examiner is invited to call the undersigned attorney at the Examiner's convenience.

Respectfully submitted,
Stephen Meek et al., by



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